Claudia Dinar Monica, 2018, **Analisis Model Matematika Pencegahan Endemik Virus *West Nile* pada Populasi Burung**. Skripsi ini dibimbing oleh Dr. Miswanto, M.Si dan Dr. Windarto, S.Si, M.Si, Departemen Matematika, Fakultas Sains dan Teknologi, Universitas Airlangga, Surabaya.

ABSTRAK

Virus *West nile* adalah jenis virus yang dapat menimbulkan penyakit yang ditularkan melalui gigitan nyamuk betina. Virus *West nile* pada burung terjadi cukup cepat dan bisa berakibat fatal. Spesies burung yang rentan seperti angsa, menunjukkan berbagai gejala neurologis mulai dari terkulai dan kelumpuhan sayap, tidak mampu bergerak dan mungkin inkoordinasi. Siklus penyebaran terjadi antara nyamuk dan burung terjadi secara dua arah. Hal ini berarti, virus *west nile* dapat menyebar dari nyamuk ke burung atau burung ke nyamuk.Oleh karena itu perlu dikaji penyebaran endemik virus *west nile* pada populasi burung.

Pada skripsi ini dikaji model matematika pencegahan endemik virus *west nile* pada populasi burung. Dari model diperoleh dua titik setimbang yakni titik setimbang bebas virus *west nile* (E_0) dan titik setimbang endemik (E_1). Selain itu diperoleh besaran *basic reproduction rasio* (R_0) yang menentukan eksistensi dan kestabilan titik setimbang. Titik setimbang E_0 stabil asimtotis lokal jika $R_0 < 1$. Sedangkan titik setimbang E_1 cenderung stabil asimtotis lokal jika $R_1, R_2 > 1$. Berdasarkan hasil simulasi numerik diperoleh fakta bahwa pemusnahan pada populasi burung dan nyamuk dapat mengurangi jumlah penyebaran virus *west nile*.

Kata kunci: virus *west nile*, populasi burung, model matematika, kestabilan.

Claudia Dinar Monica, 2018, **Analysis of Endemic *West Nile* Virus Prevention Mathematical Model in Bird Population**. This final project is under advised by Dr. Miswanto, M.Si and Dr. Windarto, S.Si, M.Si. Mathematics Departement, Science and Technology Faculty, Airlangga University, Surabaya.

ABSTRACT

West nile virus is a type of virus that can cause a disease transmitted through the bite of a female mosquito. *West nile* virus in birds occurs pretty quickly and can be fatal. Vulnerable bird species, such as geese, show various neurological symptoms from drooping and wing paralysis, unable to move and possibly uncoordinated. The spreading cycle between mosquitoes and birds occurs in both directions. This means, *west nile* virus able to spread from mosquitoes to birds or birds to mosquitoes. Therefore, it is necessary to examine the spread of endemic *west nile* virus in bird populations.

This thesis studies about mathematical model for prevention of endemic *west nile* virus in bird population.. From the model, we obtain two equilibrium points namely *west nile* virus free equilibrium (E_0) and endemic equilibrium (E_1). Furthermore, we also obtain *basic reproduction rasio* (R_0) which determine the existence and stability of equilibrium. *West nile* virus free equilibrium E_0 is locally asymptotically stable if $R_0 < 1$, meanwhile E_1 tends to asymptotically stable if $R_1, R_2 > 1$. Based on numerical simulation results, we obtained that the destruction of bird and mosquito populations are able to reduce the number of *west nile* virus transmission.

Keywords: *west nile* virus, bird population, mathematical model, stability.